

Commercialization of a Laser Heterodyne Receiver for Measuring Greenhouse Gases in an Atmospheric Column, Phase I

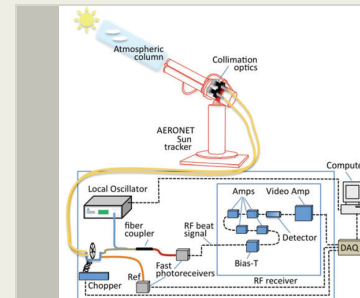
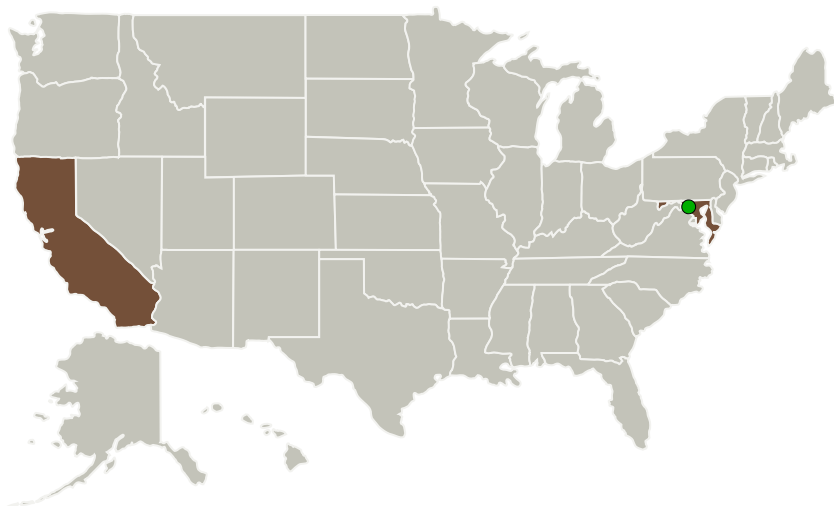
Completed Technology Project (2015 - 2015)



Project Introduction

In order to address the inevitable need to deploy inexpensive, accurate, reliable sensors that can automatically perform greenhouse gas data collection, the proposed Phase I project builds on the measurement technique described in the paper, "Miniaturized Laser Heterodyne Radiometer for Measurement of Carbon Dioxide CO₂ in the Atmospheric Column" by Wilson et al. wherein sunlight is used as the radiometer's signal source. While redesigning the RF receiver in the Mini-Laser Heterodyne Radiometer (Mini-LHR) under a NASA purchase order, Paul Finkel Consulting became familiar with every aspect of the Mini-LHR optical, electrical, software and mechanical design. Along the way, we saw several opportunities to further reduce size and cost, and improve accuracy of the entire system. Likewise, power consumption can be decreased and reliability improved. In the end, the resulting Phase I proof-of-concept system will have fewer moving parts, be lower cost, consume less power –important for solar powered installations – and will be more compact than the original system and have an accuracy better than 0.3%. Most notably, the product of Phase I will serve as a platform to validate further hardware and software improvements that will be incorporated into a commercial version in Phase II.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Paul Finkel Consulting	Lead Organization	Industry	Redwood City, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

▶ **June 2015:** Project Start

✓ **December 2015:** Closed out

Closeout Summary: Commercialization of a Laser Heterodyne Receiver for Measuring Greenhouse Gases in an Atmospheric Column, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/138872>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Paul Finkel Consulting

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

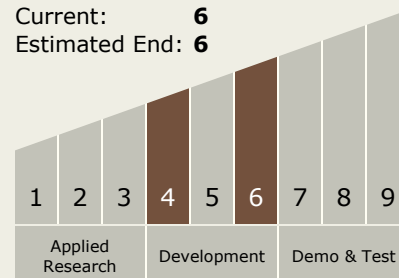
Carlos Torrez

Principal Investigator:

Marv Vickers

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6

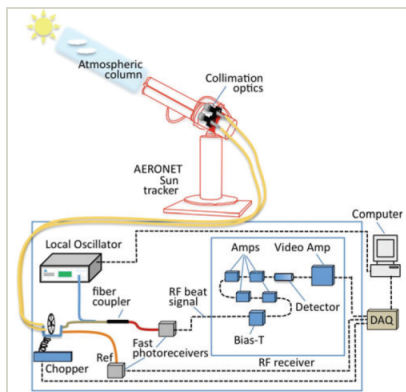


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Images



Briefing Chart Image

Commercialization of a Laser Heterodyne Receiver for Measuring Greenhouse Gases in an Atmospheric Column, Phase I
(<https://techport.nasa.gov/image/129060>)

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.2 Observatories
 - └ TX08.2.3 Distributed Aperture

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System